



National Museum of Health and Medicine

Otis Historical Archives

OHA 220.07 MacNeill Collection

Accession Number: 2014.0006

Date of Records: 1951-1955

Size: 21 boxes

Finding Aid by: Eric W. Boyle (2015)

Background Note: The advent of kidney dialysis had a powerful impact on the postwar generation of researchers, transforming the field of medical engineering and encouraging efforts to devise mechanical aids for other physiological function, including those of hearts and lungs. Dr. Arthur E. MacNeill, a physician and engineer, coined the term “therapeutic engineering” to describe his area of interest and special concern in this burgeoning field of research and design.

MacNeill sought to apply physiological principles to the instrumentation used in clinical medicine. He believed that such instrumentation should be defined in terms of its function, rather than as an “artificial organ.” MacNeill had designed his first blood pump while he was still a medical student in 1933. He had received funding from the United States Army to adapt his blood pump for kidney dialysis, and in the early 1960s, a dialysis machine that he had developed came into wide use because it was portable and did not require an external pump. MacNeill had designed it to utilize the natural pumping action of the artery to which it was connected. Subsequently, in accordance with his view of therapeutic instrumentation, MacNeill proposed, with a grant from the Hartford Foundation, to develop and build improved pumps and oxygenators that would aid the heart and lungs temporarily during congestive heart failure and other disabling heart and lung conditions. His group would also develop improved blood dialyzers to treat uremia, edema, and systemic poisoning, and to aid kidneys affected by heart failure or other ailments.

Finally, MacNeill’s team also attempted to construct bedside monitoring devices for blood pressure, pulse rate, temperature, respiration, and other vital signs. By 1962, MacNeill’s team had adapted his machine for the treatment of congestive heart failure and edema. The group also drew on this technology to create an environment for organs that was similar enough to the natural environment to preserve the organ until it could be transplanted. Unfortunately, the Buffalo General Hospital where MacNeill undertook his research underwent a reorganization shortly thereafter that left MacNeill without the staff support he needed to carry out clinical trials of the instrumentation he and his colleagues had developed. Subsequently, he left the hospital and established his own Dialysis Research Institute.



Series/Scope and Content Note: The NMHM's Historical Collections houses dialyzer prototypes designed and built by MacNeill between 1952 and 1954. The Research and Development Division of the Office of the Surgeon General, U.S. Army, funded the development of this device under contract DA-49-007-MD-475, as the use of the artificial kidney by the 11th Evac Hospital in Korea proved the value of this new technology, but remained cumbersome under field conditions. The MacNeill device was compact, easier and quicker to clean, and had a less complex design. OHA 220.07 consists of three notebooks that describe the development, testing, and operation of the device, along with correspondence and research related to its development, along with the outcomes from MacNeill's research. The design was ultimately put in production as the MacNeill-Collins dialyzer and used to a limited extent during the Vietnam Conflict between 1968 and 1969. The MacNeill Collection also includes material from throughout his prolific career before and after his work for the U.S. Army. This includes extensive correspondence, published articles, abstracts, presentations, articles, publications, drawings, exhibits, clippings, photographs, and notebooks related to the development of blood pumps and dialyzers.

SERIES 001: CORRESPONDENCE (1939-1984)	4
SERIES 002: BACKGROUND INFORMATION AND PUBLICATIONS	7
SERIES 003: INSTRUCTIONS, CLIPPINGS AND PHOTOGRAPHS	10
SERIES 004: BOOKS	11
SERIES 005: CLIPPINGS, ARTICLES, REPRINTS AND HANDBOOKS	11
SERIES 006: RESEARCH NOTEBOOKS	12
SERIES 006: GLASS SLIDES	27

SERIES 001: CORRESPONDENCE (1939-1984)

This series includes letters and papers arranged chronologically by year but not arranged chronologically within each year. Papers supplementing correspondence include grant applications and reports to granting bodies (e.g. Hartford Foundation, Playtex, Hitchcock). There are also numerous sketches and drawings of blood pumps, dialyzers, and other types of equipment. There are also some early drafts of some articles that were later published as well as lectures and papers Dr. MacNeill delivered at various professional meetings. Additional materials include shop notes, work orders, and requisitions.

Boxes 002-008 over a period of time during which MacNeill was based at the University of Buffalo and Buffalo General Hospital. His work there is documented in grant reports, news articles, reflections, and explanations in correspondence to others during this time. His successes and many frustrations are described throughout. Dr. MacNeill's most productive working relationship was in Buffalo where he collaborated with Dr. John Doyle. Doyle's untimely death in 1966 ended a very collegial relationship for Dr. MacNeill. Between 1958 and 1966 MacNeill also worked under a contract with Dr. Warren Collins (father and son) to market what became the MacNeill-Collins Dialyzer and the MacNeill-Collins Blood Pump.

Boxes 009-010 cover the period after 1966. After the contract with Collins ended (and in the years after leaving Buffalo and setting up a consulting office based at his new home in Sunapee, NH), Dr. MacNeill attempted to pursue other arrangements. From 1970 to 1974 he worked under contract with the



Lancer Corporation, a relationship that was positive at the beginning and quickly became difficult because of the company's financial situation (they declared bankruptcy in 1974).

Box 011 contains miscellaneous and undated correspondence, including predominantly correspondence with Dr. William Kolff from 1954 to 1967, material related to papers and sketches produced by MacNeill, as well as manuscript fragments and correspondence on the topic of therapeutic engineering from 1952 to 1954.

Box 012 contains all of the correspondence Dr. MacNeill had with various branches of the military, including reports from a three-year grant for research and development of a small, compact dialyzer. The donor separated the letters and documents from the other correspondence above.

SERIES 002: BACKGROUND INFORMATION AND PUBLICATIONS

This series includes biographical information on Dr. MacNeill, annual reports, anniversary publications, and a list of MacNeill's published work. This includes a bound volume of articles by MacNeill and separate folders on blood pump development and military-related work.

SERIES 003: INSTRUCTIONS, CLIPPINGS AND PHOTOGRAPHS

This series includes instructions for operating and assembling blood pumps and dialyzers, photocopies of newspaper clippings related to their operation, and photographs of early blood pumps and dialyzers as well as equipment developed a number of years later. Many photographs include handwritten notations and explanations on the back or on attached papers.

SERIES 004: BOOKS

The donors of the MacNeill Collection included a small number of books that they considered representative of his interests, including volumes on the subjects of dialysis, renal and urinary diseases, patent law, medical history, and machinery and tools.

SERIES 005: CLIPPINGS, ARTICLES, REPRINTS AND HANDBOOKS

The two boxes in this series include material on the following subjects: medical history, medical ethics, newly developed plastics/screening/tubing, new shop equipment, metal work, medical instrumentation, patents for medical equipment, hospital administration/politics, legislation related to medicine, blood banks, renal function and disease, lives saved using his or other dialysis machines, dialysis and blood pump research by others, issues related to long-term dialysis care, at home dialysis, dialysis clinics and hospitals, military medicine, German post-war medicine, psychology and renal disease, and research funding.

SERIES 006: RESEARCH NOTEBOOKS

This series includes 15 research notebooks used by MacNeill from 1945 to 1960. These notebooks



document the meticulous and complex work involved with the development and testing of blood pumps and dialyzers. The finding aid below includes some representative examples of the material contained in these journals.

SERIES 007: GLASS SLIDES

There are two boxes of glass slides that show a variety of equipment as well as some text material related to blood pump and dialyzer development.

BOX AND CONTENT LIST

SERIES 001: CORRESPONDENCE (1939-1984)

Box 001: Correspondence, 1939-1949

00001: Correspondence, 1939-1946

00002: Correspondence, 1947

00003: Correspondence, 1948

00004: Correspondence, 1949 [1 of 2]

Box 002: Correspondence, 1950-1951

00001: Correspondence, 1949 [2 of 2]

00002: Correspondence, 1950 [1 of 2]

00003: Correspondence, 1950 [2 of 2]

00004: Correspondence, 1951 [1 of 2]

00005: Correspondence, 1951 [2 of 2]

Box 003: Correspondence, 1952-1955

00001: Correspondence, 1952

00002: Correspondence, 1953 [1 of 2]

00003: Correspondence, 1953 [2 of 2]



00004: Correspondence, 1954 [1 of 2]

Box 004: Correspondence, 1954-1956

00001: Correspondence, 1954 [2 of 2]

00002: Correspondence, 1955 [1 of 2]

00003: Correspondence, 1955 [2 of 2]

00004: Correspondence, 1956 [1 of 3]

00005: Correspondence, 1956 [2 of 3]

Box 005: Correspondence, 1956-1958

00001: Correspondence, 1956 [3 of 3]

00002: Correspondence, 1957 [1 of 3]

00003: Correspondence, 1957 [2 of 3]

00004: Correspondence, 1957 [3 of 3]

00005: Correspondence, 1958 [1 of 4]

Box 006: Correspondence, 1958-1959

00001: Correspondence, 1958 [2 of 4]

00002: Correspondence, 1958 [3 of 4]

00003: Correspondence, 1958 [4 of 4]

00004: Correspondence, 1959 [1 of 2]

00005: Correspondence, 1959 [1 of 2]

Box 007: Correspondence, 1960-1961

00001: Correspondence, 1960 [1 of 2]

00002: Correspondence, 1960 [2 of 2]



00003: Correspondence, 1961 [1 of 2]

00004: Correspondence, 1961 [2 of 2]

Box 008: Correspondence, 1962-1964

00001: Correspondence, 1962 [1 of 2]

00002: Correspondence, 1962 [2 of 2]

00003: Correspondence, 1963 [1 of 2]

00004: Correspondence, 1963 [2 of 2]

00005: Correspondence, 1964 [1 of 2]

00006: Correspondence, 1964 [2 of 2]

Box 009: Correspondence, 1965-1967

00001: Correspondence, 1962 [1 of 2]

00002: Correspondence, 1962 [2 of 2]

00003: Correspondence, 1963 [1 of 2]

00004: Correspondence, 1963 [2 of 2]

00005: Correspondence, 1964 [1 of 2]

00006: Correspondence, 1964 [2 of 2]

Box 010: Correspondence, 1967-1984

00001: Correspondence, 1967

00002: Correspondence, 1968-1970

00003: Correspondence, 1971

00004: Correspondence, 1972-1984

Box 011: Correspondence, Misc. and Undated



00001: Correspondence, Dr. William Kolff, 1954-1967

00002: Correspondence, Papers and Sketches (undated) [1 of 2]

00003: Correspondence, Papers and Sketches (undated [2 of 2]

00004: Manuscript Fragments and Correspondence, Therapeutic Engineering, 1952-54

Box 012: Military Material, 1941-1965

00001: Military Correspondence, 1941-1960

00002: Military Correspondence, 1961-1965

00003: U.S. Navy Contract, 1950-1951

00004: Army Grant, Small Compact Dialyzer, 1953-1955 [1 of 2]

00005: Army Grant, Small Compact Dialyzer, 1953-1955 [2 of 2]

00006: Dialysis Machine Used by the Army, 1955-1966 [1 of 2]

00007: Dialysis Machine Used by the Army, 1955-1966 [2 of 2]

SERIES 002: BACKGROUND INFORMATION AND PUBLICATIONS

Box 013:

00001: Biographical Data, Arthur E. MacNeill

00002: Dialysis Research Institute, Annual Report (1979), 25th Anniversary of First Clinical Use of Dialyzer

00003: 50 Year Anniversary, Therapeutic Engineering in Buffalo, Oral History (1996)

00004: Doyle's Book Describing Work with Dr. MacNeill, 1960-62

00005: Hartford Foundation Book on 25 Years in Biomedical Research, 1981-83

00006: Papers and Publications by Arthur E. MacNeill

00007: Papers That May Not Have Been Sent

00008: Articles Written by MacNeill and Associates (Bound Volume)



- Arthur E. MacNeill, "Synthetic Organ Mechanisms," recopied from *The Military Surgeon* article "Therapeutic Engineering in Military Medicine," (Jan. 1949): 36-38.
- Arthur E. MacNeill, "An Adaptable Design: Pilot Model for In Vivo Dialysis of Blood," article submitted to *Science* in 1948 and *New England Journal of Medicine* in 1949, neither of which chose to publish the article.
- Arthur E. MacNeill, "Some Possible Uses of Blood Dialyzers in the Surgeon's Practice," paper read at Annual Meeting of the New England Surgical Society (Sept. 23, 1949).
- Arthur E. MacNeill, "Blood Dialyzer Design," *Bulletin, Cardiovascular Diseases* (1953): 173-77.
- Arthur E. MacNeill, "Synthetic Organ Mechanisms—A Challenge to the Instrument Designer," paper at the Eighth National Conference of the Instrument Society of America (Sept. 21-25, 1953).
- Arthur E. MacNeill, "The Blood Dialyzer Viewed as an Automatic Therapeutic Computer," *Proceedings of the Instrument Society of America* (1955): 3-5.
- John Doyle, Arthur E. MacNeill, et al. "Clinical Applications of a New Blood Pump," *Circulation* (Nov. 1956): 929.
- J.E. Doyle, A.E. MacNeill, et al. "Dialysis of Urea in a Parallel Tube Blood Dialyzer," *Federation Proceedings* (March 1958): 38.
- Arthur E. MacNeill, "Hemodialysis for Blood Chemical Derangements," *Hospital Topics* (Sept. 1958).
- Roland Anthone, Sidney Anthone, John E. Doyle, and Arthur E. MacNeill, "Parallel Flow Dialyzer: A Versatile Synthetic Capillary Bed Mechanism," a Scientific Exhibit presented at the Clinical Congress of the American College of Surgeons in Chicago, IL (Oct. 6-10, 1958).
- W. K. Kerr, S. Anthone, R. Anthone, and N.C. Carruthers, "Partial Nephrectomy for Hypernephroma in a Solitary Kidney: A Case Report," *The Journal of Urology* (April 1959): 509-11.
- A.E. MacNeill, "Directions for the Blood Pump," (Sept. 1959).
- Arthur E. MacNeill, et al. "Technic with Parallel Flow, Straight Tube Blood Dialyzer," *New York State Journal of Medicine* (Nov. 15, 1959): 4137-70.
- Sidney Anthone, Roland Anthone, and Jose Rodriguez, "Chemical Correction of Citrated Bank Blood By Means of a Parallel Flow Dialyzer," *Surgical Forum* (1960): 182-83.
- Sidney Anthone, Roland Anthone, and John E. Doyle, "Acute Renal Failure in Obstetric Patients: Treatment by Hemodialysis," *Obstetrics and Gynecology* (Feb. 1960): 146-57.
- Roland Anthone and Sidney Anthone, "Experiences with Hemodialysis in Surgical Patients," *AMA Archives of Surgery* (Aug. 1960): 205-11.
- Constante N. Firme, Roland Anthone, Sidney Anthone, and Arthur E. MacNeill, "Studies with a Cellulose Membrane Oxygenator," *The Journal of Thoracic and Cardiovascular Surgery* (Aug. 1960): 253-59.
- John E. Doyle, Sidney Anthone, Roland Anthone, and Arthur E. MacNeill, "Ultrafiltration with a Parallel Flow, Straight Tube Blood Dialyzer," *New York State Journal of Medicine* (Jan. 15, 1962): 185-202.
- Samuel Shatkin, Roland Anthone, Sidney Anthone, and Arthur E. MacNeill, "Organ Perfusion," *Plastic and Reconstructive Surgery* (Feb. 1962): 167-175.
- Sidney Anthone and Roland Anthone, "Treatment of Acute and Chronic Edema by Extracorporeal Ultrafiltration," *Circulation* (1962): 87.
- Arthur E. MacNeill and John Bowler, "Irrigation and Tidal Drainage," *New England Journal of Medicine* 223 (1940): 128-32.



00009: Materials Related to Blood Pumps

Folder includes some published articles, abstracts, presentations, articles, publications, drawings, and exhibits related to blood pumps.

- "A New Blood Pump Design" (describes Hanover work 1948-50)
- "A Dialyzer of Great Adaptability" (1949)
- "Further Development and Experimental Trial of new Blood Pump Design" (1951)
- "Trial of New Blood Pump Design: Progress Report, July 1, 1951-May 1, 1952"
- "Report on Activities Carried Out Under Blood Pump Grant: July 1, 1952-June 30, 1953"
- "Further Development of a Synthetic Capillary Bed Mechanism and new Type of Blood Pump for Study and Treatment of Cardiac Failure" (1951)
- "Some Fundamental Considerations in the Design of Blood Pumps" (1951)
- "Blood Pump Demonstration" (1952—as shown on WBEN-TV in Buffalo)
- "Blood Dialyzer Design" with Special Notation re: Blood Pump (1953)
- "Synthetic Organ Mechanisms" (1953)
- "Synthetic Organ Mechanism Program," Chronic Disease Research Institute, Buffalo (1954)
- "Some Basic Problems in the Design of Bedside Therapeutic Apparatus" (1955)
- "Blood Treatment Apparatus" (1953)
- "Application of a Blood Dialyzer" (1954)
- "Clinical Use of a Blood Dialyzer" (1955)
- "Clinical Applications of a New Blood Pump" (1956)
- "Unusual Hemolytic Transfusion Reaction with Renal Failure Treated by Hemodialysis" (1956)
- "Some Observations on Heart-Lung Machines" (1957)
- "A Note on the Naming of Synthetic Organ Mechanisms" (1958)
- "General Instructions for MacNeill-Collins Blood Pump" (1958)
- "A Report on the Blood Oxygenator Project" (1958)
- "Treatment of Renal Failure with a Parallel Flow, Straight Tube Blood Dialyzer" (1959)
- "Operating Directions for MacNeill-Model 16 A-P and 16 A-M Blood Pumps" (1959)
- "Dupulser for MacNeill-Collins Blood Pump" (1959)
- "Bilobar and Trilobar Blood Valves" (1960)
- "Ultrafiltration with the MacNeill-Collins Blood Dialyzer" (1961)
- "A Note on Availability of MacNeill Blood Dialyzers and MacNeill Blood Pumps" (1962)
- "Recent Advances in the Application of a Dialyzer" (1963)
- "A Method for Testing blood Pumps" (1964)
- "Heparin Requirement During Dialysis with the Parallel Flow, Straight Tube Blood Dialyzer" (1964)
- "Dialysis for the Community Hospital" (1964)
- "Treatment of Gastric Ulcer and Anuria in 1876" (1964)
- "Abstract: Blood Dialysis and Ultrafiltration in the Treatment of Congestive Heart Failure"

00010: Publications Related to Military

00011: "Some Problems with Design of Apparatus for the Military Surgeon" (1948 draft)



00012: Case Report: Unusual Hemolytic Transfusion Reaction With Renal Failure Treated by Hemodialysis (First Clinical Use—1954), with Two Photographs

00013: Reprint: “Synthetic Organ Mechanism Program,” by MacNeill

SERIES 003: INSTRUCTIONS, CLIPPINGS AND PHOTOGRAPHS

Box 014:

00001: Dialyzer Instructions for use with a Dog

00002: Instructions for Assembling Various Dialyzers

00003: Directions for Assembling the MacNeill-Collins Stand and Dialyzer

00004: Directions for Operating the MacNeill-Collins Blood Dialyzer

00005: Blood Pump and Dialyzer Connections, Diagrams and Photographs

00006: Newspaper Clippings, Photocopies (1957-1958)

00007: Photographs: Early Inventions/Devices for Patient Comfort

00008: Photographs: Early Dialysis Patients

00009: Exhibit and Laboratory Photographs (1955-1963)

00010: Photographs from Poster—“Research Uses”

- Laboratory Scenes
- Test of Cellophane vs. Teflon
- One Tube Dialyzer
- Three-tube Dialyzer-Oxygenator
- Cross Dialysis Studies
- Kidney Perfusion with Dialyzer-Oxygenator
- O₂ and CO₂ Exchange for a Fish
- Oxygenator Studies

00011: Photographs from Poster—“Clinical Applications”

- Diagram with Machine and Patient
- Vein-to-Vein Blood Dialysis, 1956 to Date
- Ultrafiltration for Heart Failure, 1956
- Ultrafiltration, 1963
- Dialyzer in Pump-Oxygenator, 1959
- Dialysis of Transfusion Blood, 1949 to Date
- Protein Salvage from Urine



- Protein Salvage from Alscitic Acid

00012: Photographs from Exhibits—Clinical Images, Unlabeled

00013: Photographs from Exhibits—Dialyzers

- Mark I Dialyzer
- Mark IIIb Dialyzer
- Mark IIIc Dialyzer
- Mark V Dialyzer
- Mark VII Dialyzer
- Mark IXa Dialyzer

Box 015:

00001: Photographs from Exhibits—Dialyzers

00002: Irrigating and Tidal Drainage Apparatus—1939)

00003: Photographs—Equipment Components with Notation

00004: Photographs—Pumps and Dialyzer Parts Without Notations

00005: Photographs—Blood Pumps and Parts with Identifying Notes

SERIES 004: BOOKS

Box 016: Books

- Constantine L. Hampers and Eugene Schupak, *Long-Term Hemodialysis: The Management of the Patient with Chronic Renal Failure* (New York: Grune & Stratton, 1967).
- W. Howship Dickinson, *On Renal and Urinary Affections: Miscellaneous Affections of the Kidneys and Urine* (New York: William Wood & Company, 1885).
- Richard H. Shryock, *American Medical Research Past and Present* (New York: The Commonwealth Fund, 1947).
- John Kenneth Wise, *Patent Law in the Research Laboratory* (New York: Reinhold Publishing Corp., 1955).
- Howard W. Dunbar, *Machinery and Tools: Catalog No. 142* (Providence, RI: Brown & Sharpe Mfg. Co., 1941).

SERIES 005: CLIPPINGS, ARTICLES, REPRINTS AND HANDBOOKS

Boxes 017 and 018:

Includes material on the following subjects: medical history, medical ethics, newly developed plastics/screening/tubing, new shop equipment, metal work, medical instrumentation, patents for



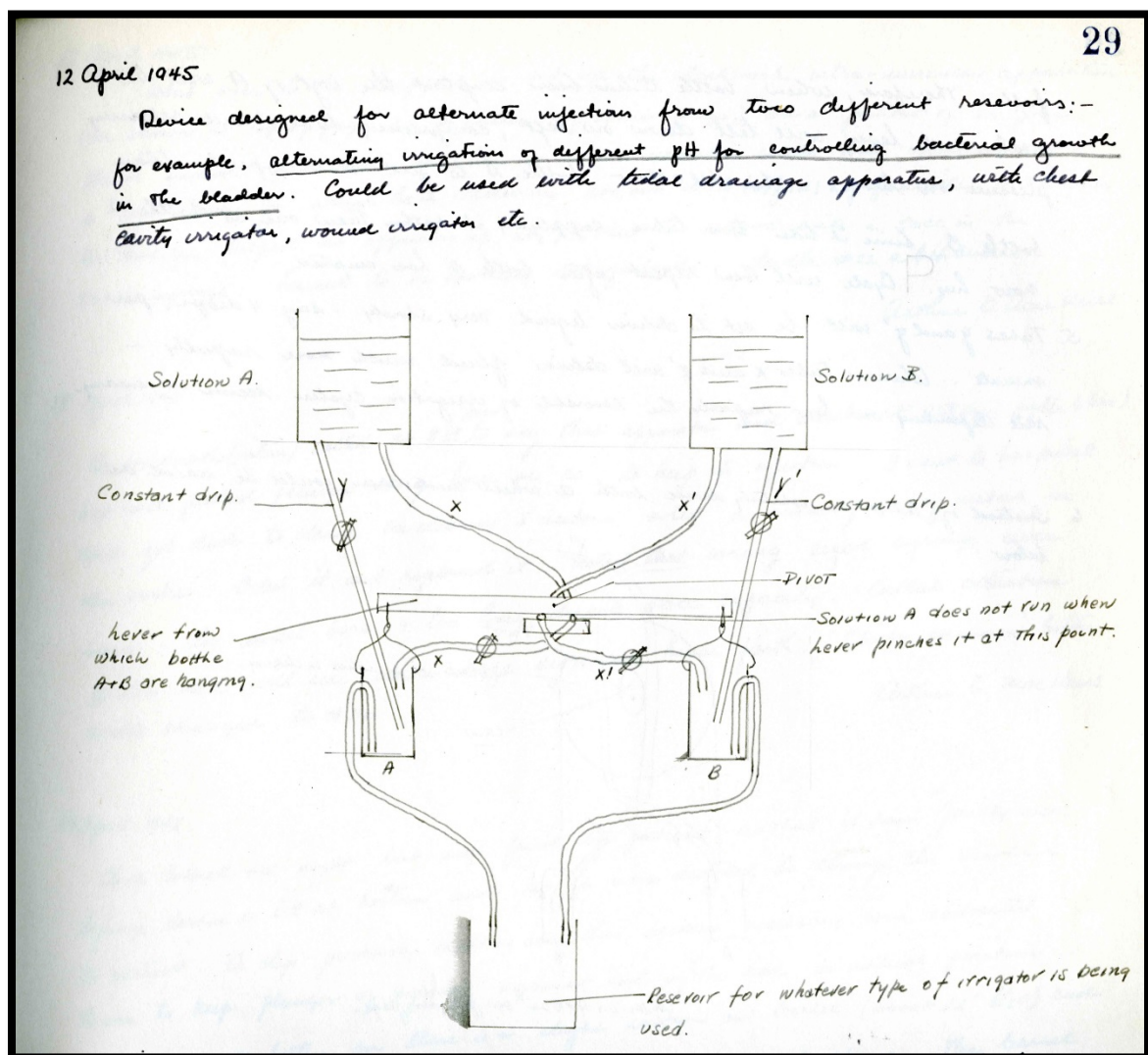
medical equipment, hospital administration/politics, legislation related to medicine, blood banks, renal function and disease, lives saved using his or other dialysis machines, dialysis and blood pump research by others, issues related to long-term dialysis care, at home dialysis, dialysis clinics and hospitals, military medicine, German post-war medicine, psychology and renal disease, and research funding.

SERIES 006: RESEARCH NOTEBOOKS

Box 019: Research Notebooks [1 of 3]

1. Dartmouth Med School, Hanover, NH, 1945

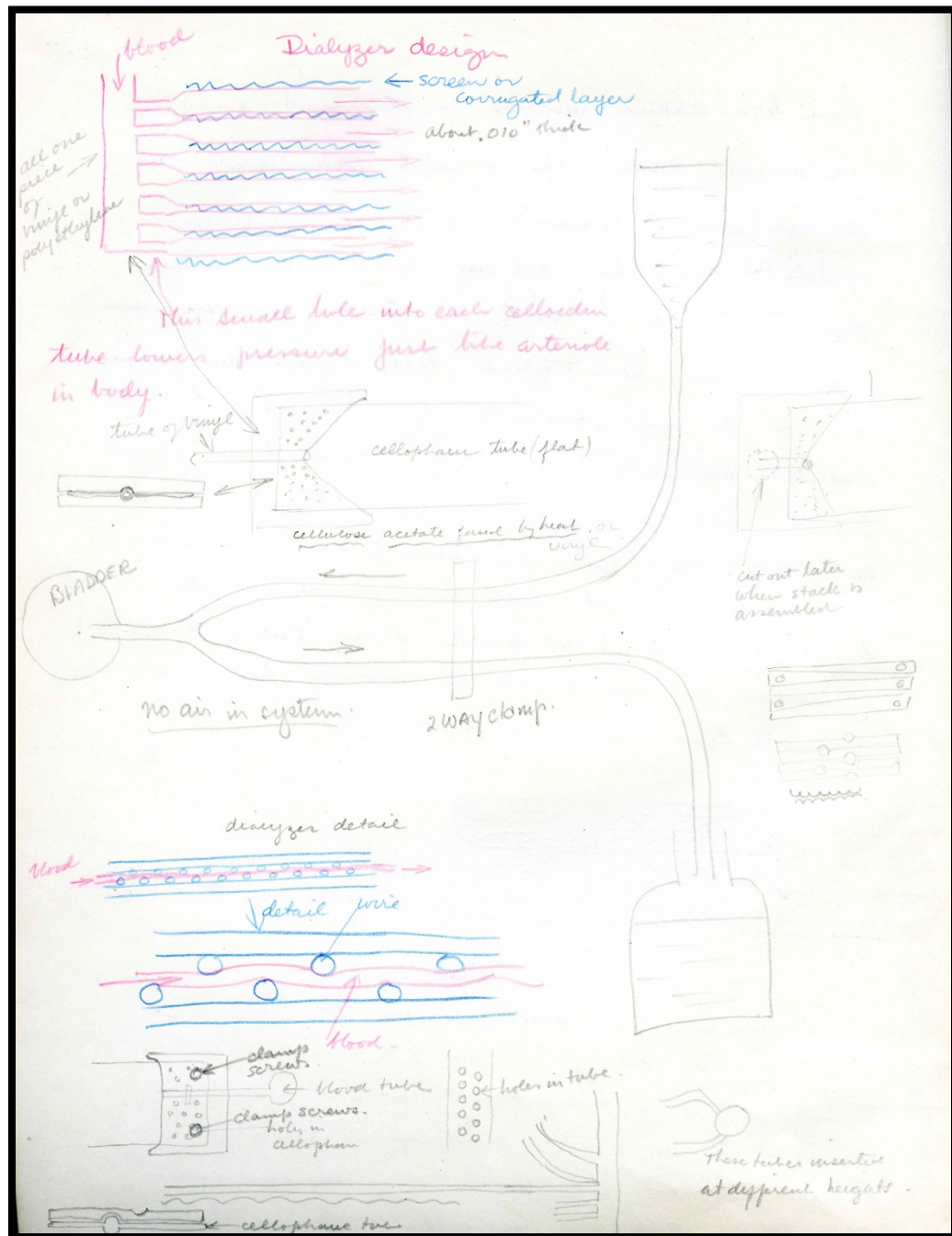
- Begins January 3, 1945 with discussion of flow meter problems in the tidal drainage apparatus and ends with sketches of the blood flow meter from July 1945. Includes a variety of sketches, diagrams, lengthy discussions, and measurements.





2. "Book # 1: Artificial Kidney Project" (November 1947-March 1948)

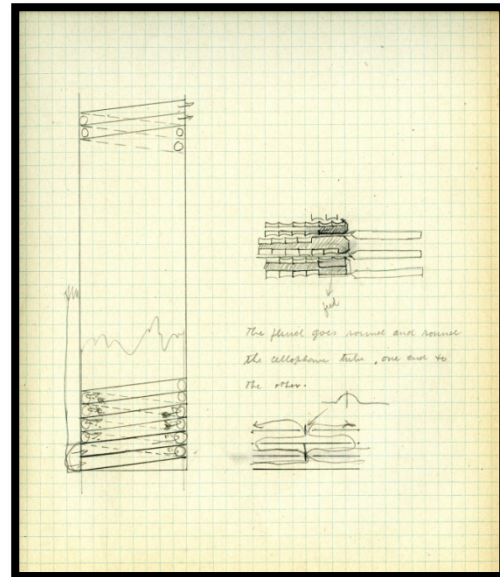
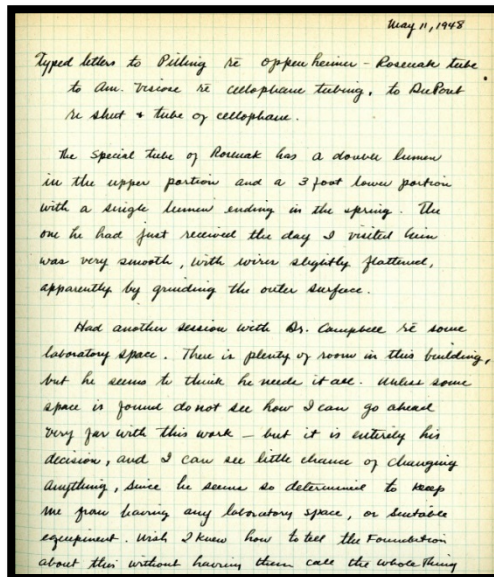
- Notes, drawings, research, and questions to be explored with early versions of blood pumps and dialyzers. Includes notes related to concerns about obtaining funds for these research projects. Notebook ends with March 25 note that the Hitchcock Foundation had approved an application that would allow work to proceed so he could begin to get the new designs into production. Inside cover includes list of "Nurse-labor-saving devices" and "Synthetic organ mechanisms."





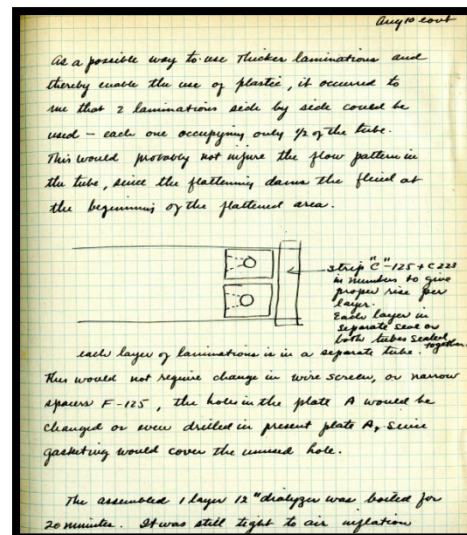
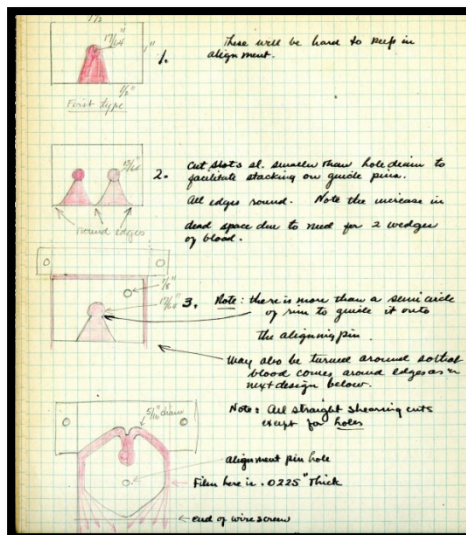
3. "Book #2: Extra Renal Dialysis" (April 1948-June 1948)

- Includes material dating from the beginnings of the work conducted under the Hitchcock grant, and concludes on May 24, 1948 with concerns about the lab shop tools at Dartmouth and the ongoing debate with colleagues about a square dialyzer model with cellophane sheets versus a tube design.



4. "Book #3: Extra-Renal Dialysis" (June 1948-September 1948)

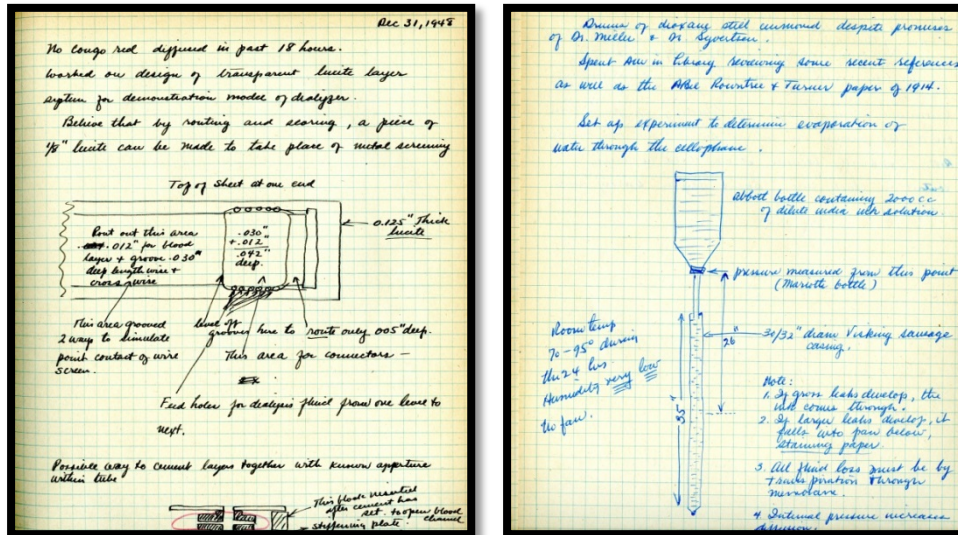
- This notebook documents MacNeill's visit to Peter Bent Brigham Hospital to meet with staff who developed a stainless steel dialyzer with plastic tubing. Includes drawings and descriptions of their work, along with calculations, drawings, and explorations of materials used for assembly of the stacks inside the MacNeill dialyzers.





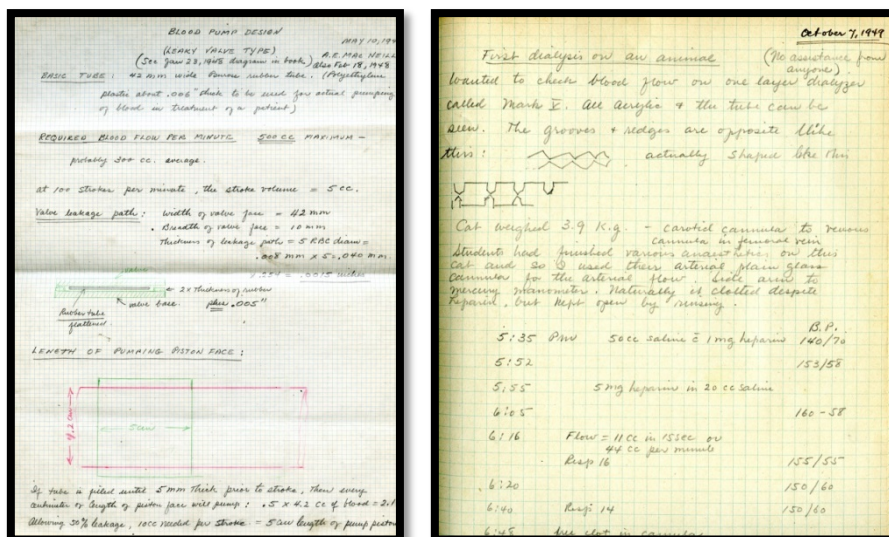
5. "Book #4: Extra-Renal Dialysis" (October 1948-April 1949)

- This notebook includes discussions of design changes, drawings, calculations, and ideas about proper materials. An entry from November 23, 1948 describes various blood pump designs under consideration, including a flat design and a circular design with rollers.



6. "Book #5: Extra-Renal Dialysis" (April 1949-October 1949)

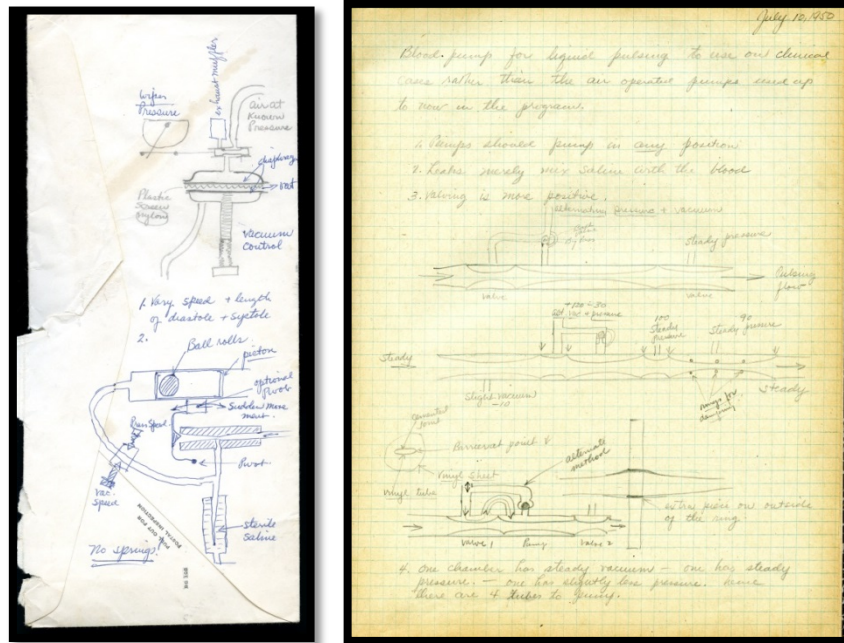
- This notebook includes drawings and notes for 27 slot dialyzers, as well as notes and drawings of a "leaky valve" blood pump. MacNeill also documents trips to discuss patent matters for dialyzers as well as the first dialysis on an animal, a cat, on October 7, 1948, along with blood pump demonstrations to hospital staff.





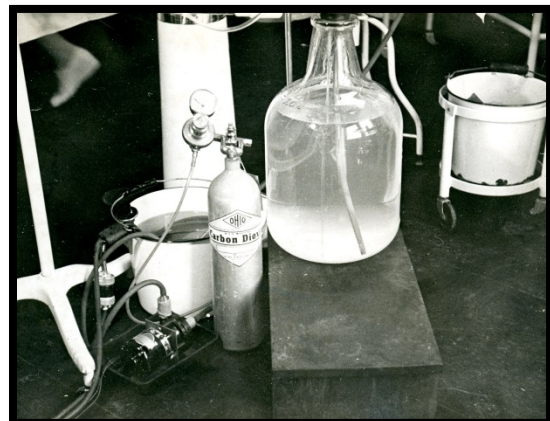
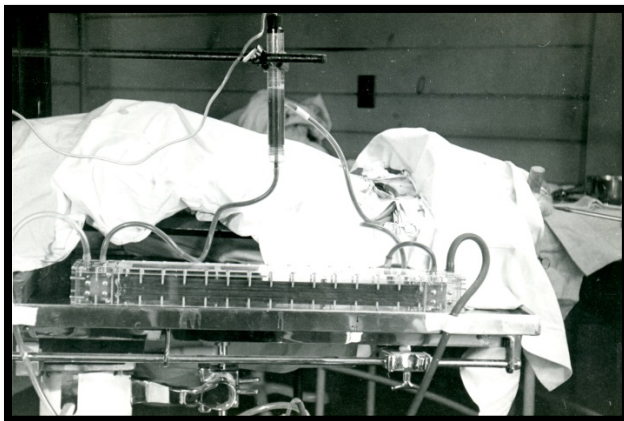
7. "Book 6: Extra-Renal Dialysis" (November 1949-September 1950)

- This notebook primarily contains ongoing notes and drawings, many related to blood pump leaks and dialyzer challenges. An entry from December 7, 1949 documents the first surgery on rabbits, with rabbit experiments continuing through January 1950. Extensive sketches of dialyzers and blood pumps include exploration of a "throw-away" dialyzer.



8. "Book #7: Dialysis on Animals" (May 1950-June 1950)

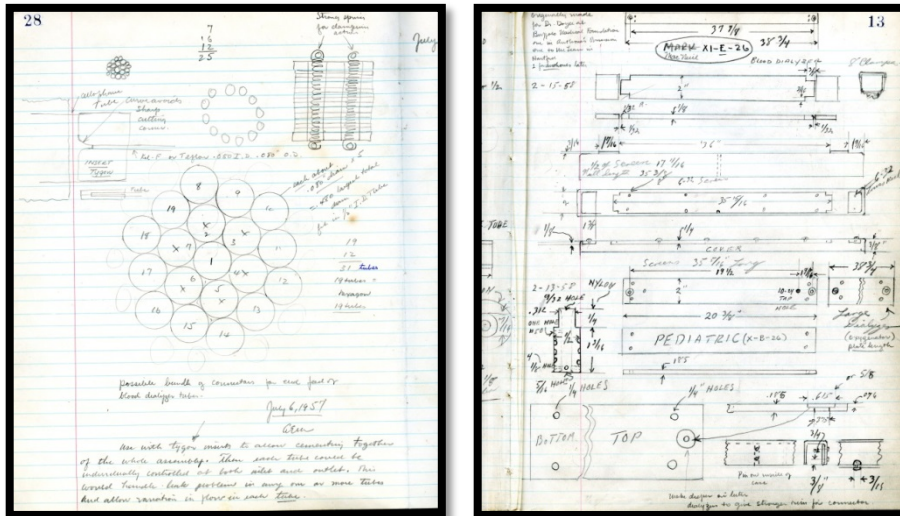
- This journal contains only the notes on three dialysis experiments with goats. A few photos of the goat experiments are included.





9-10. Two Shop Journals (1957-1958 and 1960)

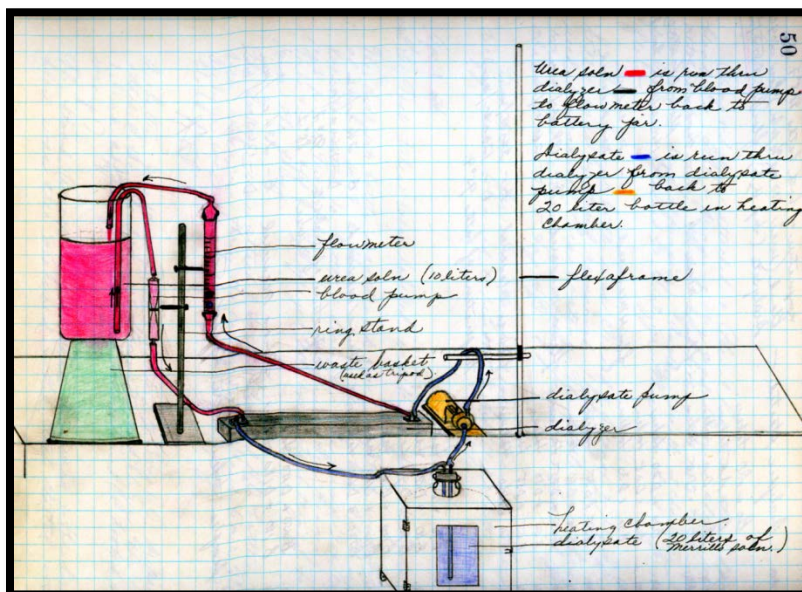
- These research notebooks contain material related to work carried out in the laboratory shop under Dr. MacNeill's direction. Shop notes contain extensive drawings and descriptions of various pumps dialyzers, small parts, and other equipment.

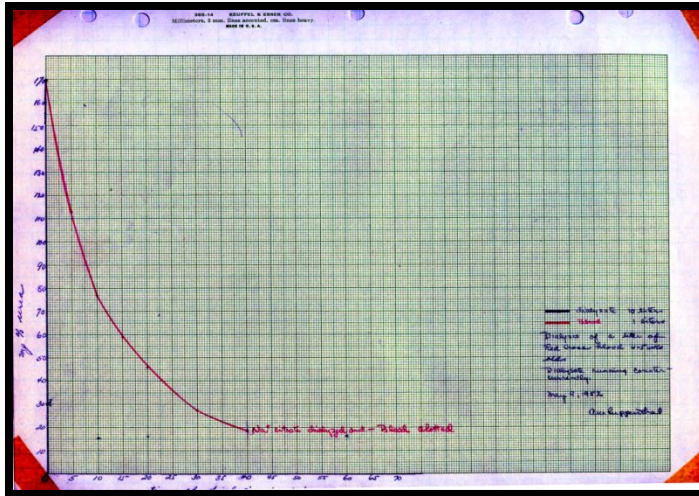


Box 020: Research Notebooks [2 of 3]

1. "Dialyzer Book" (151 pp.)

- This notebook begins on August 2, 1951 and includes notes, drawings, and graphs related to research and development for the period ending August 14, 1953.





July 18/53

Left last today too! Silicone rubber bonding agent did not hold. I had to start again. In 1 hr. I had a second seal. Unfortunately, leaks have started around the reverse again & leaked the silicone from around the peritoneum. I attached the dialyzer to the blood pump reservoir of Merrill & the dialyzer pump & from a silica gel around for a few moments. The pump did not indicate to leak the dialyzer. The dialyzer indicator would filter them very slowly. No leaks evident in the dialyzer. It was about 5 minutes before a drop came through.

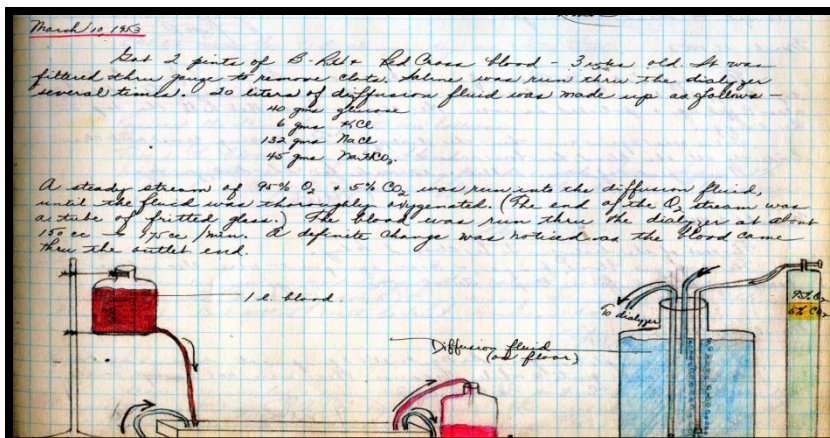
Dialyzer leaked (ran) out around the case & all at the floor. I tightened the screws (possibly too tight) & it still leaked. Silicone was thin.

John Leffler attached his new flowmeter to the dialyzer. The flow was 500 ml/min. I used the flowmeter of measuring the flow with a graduated cylinder. I measured again with the graduated cylinder. 500 ml/min. was 500 ml/min.

Tip - 1. adapters - leaks around them
2. screws on inlet plate - leaks here too - reserve
3. silicone rubber in top - " " " " " "
another layer, maybe the trick! (Hagg)

July 18, 1953

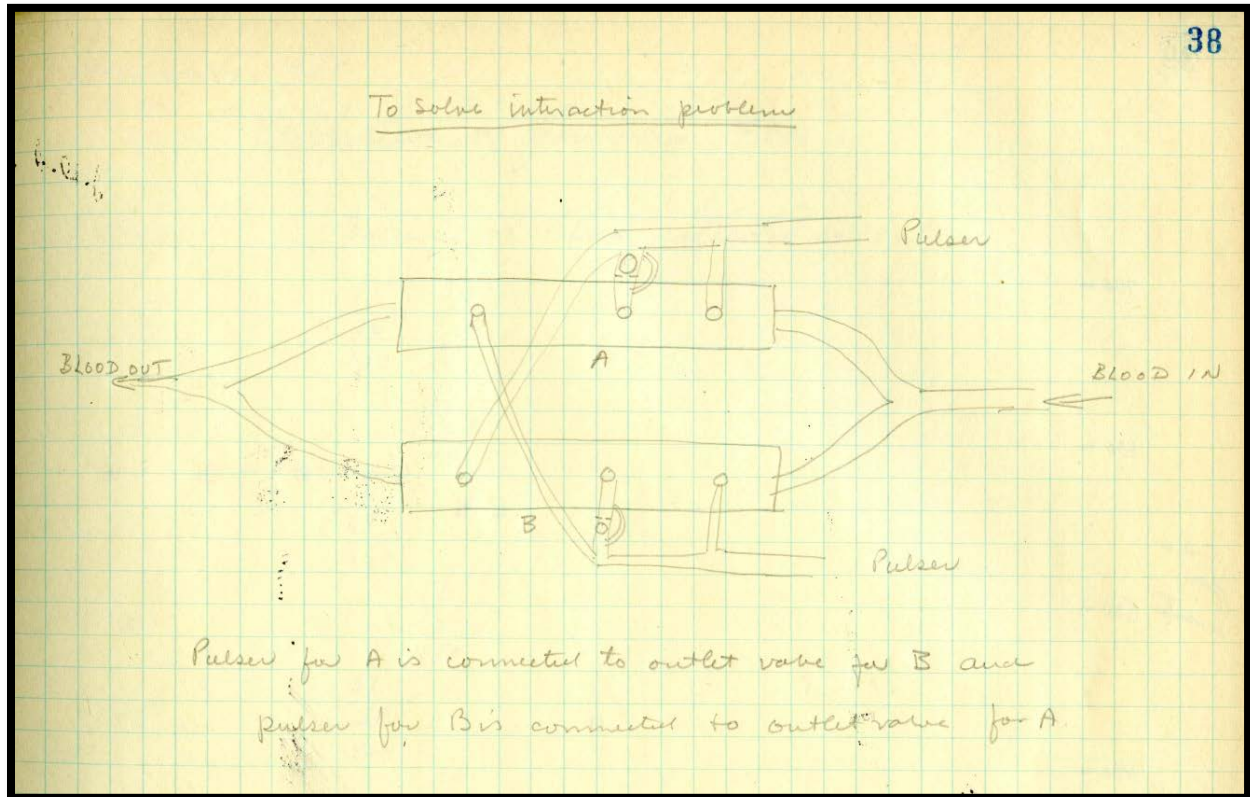
A lot of work was done on the dialyzer. Another layer of silicone rubber was tried on the cover. However, the dialyzer leaked. The second layer was removed & the dialyzer was down to the floor. The nylon side stages were left on floor. The metal. Maybe this will give a better seal. Nylon washers were made for the nylon inlet plate screws. The nylon block was again painted even the metal plate. The dialyzer was assembled again & tied for leaks. The water ran thru the dialyzer side & was. Evidently in the process of filling down the nylon one of the tubes were pierced. The dialyzer was not water tight. The case was not water tight. I noticed around the adapters. There were tight down to floor & back, however it appears that the adapter has to be lined too much & therefore ruins the inserts!





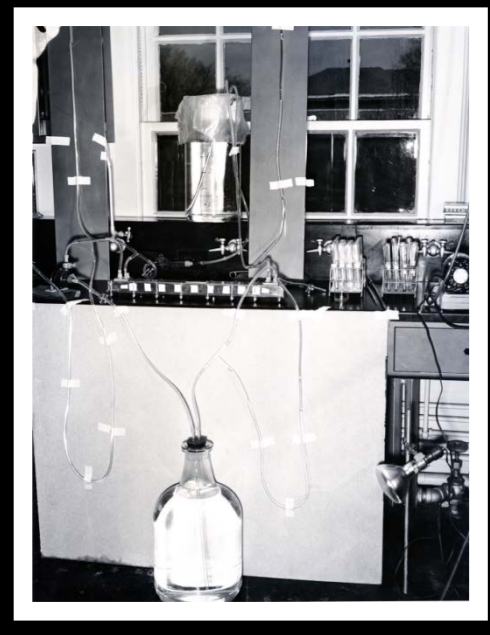
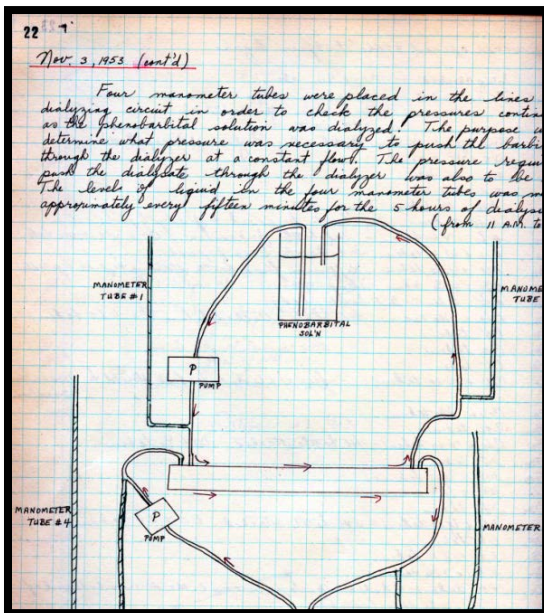
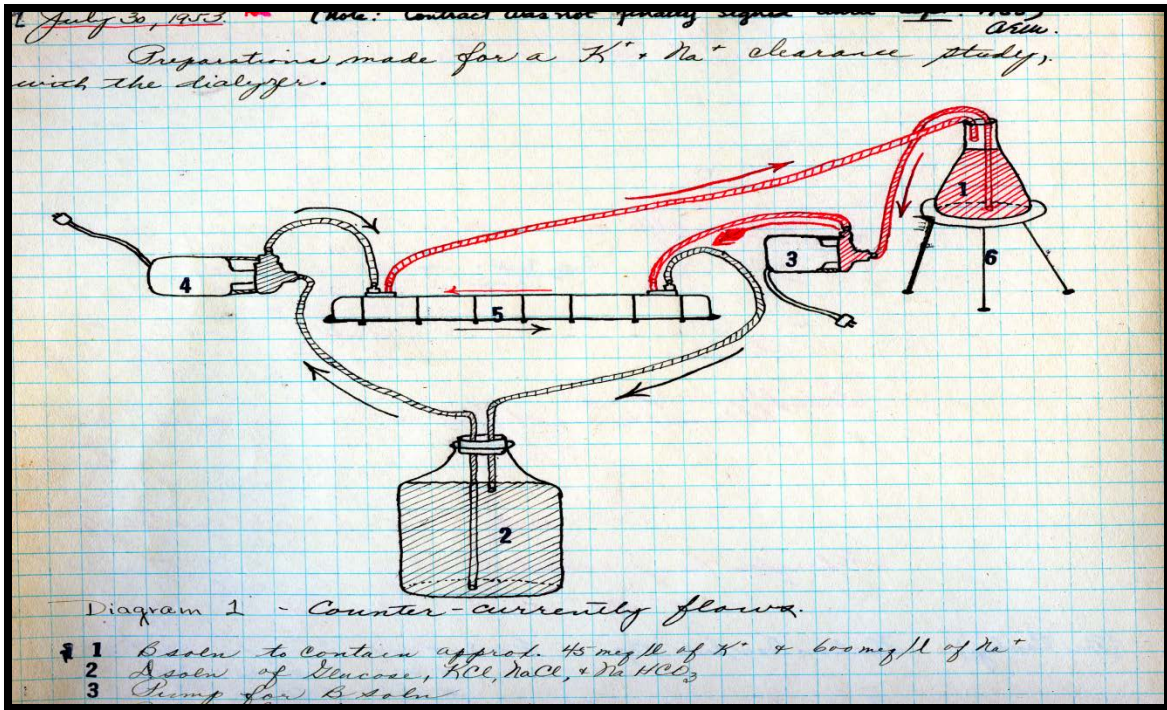
2. "Flow Meter Studies" (151 pp.)

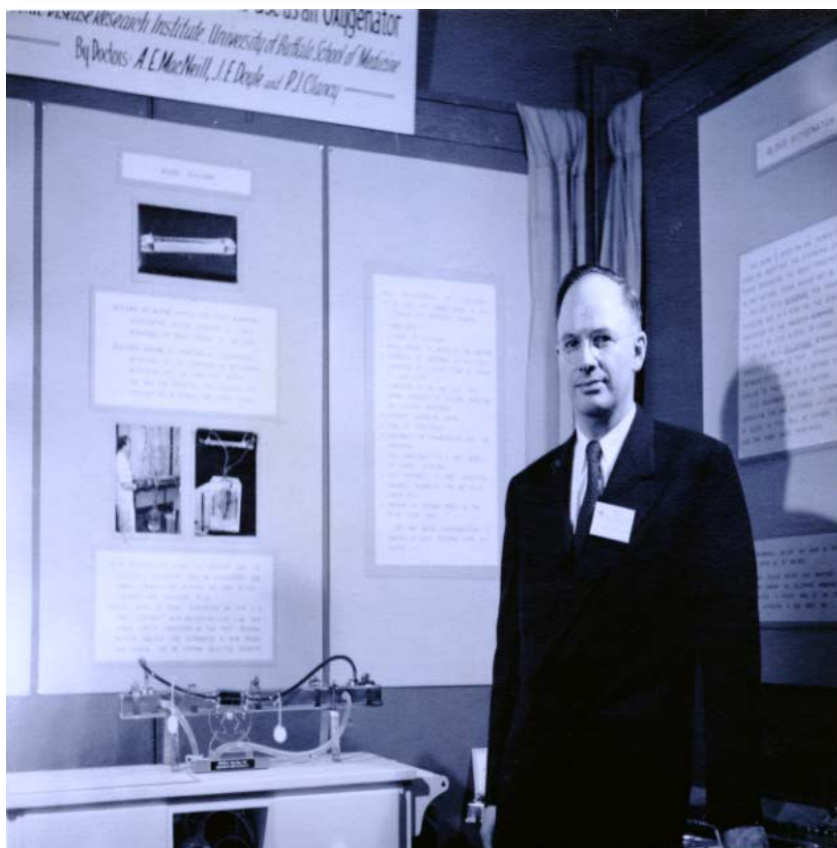
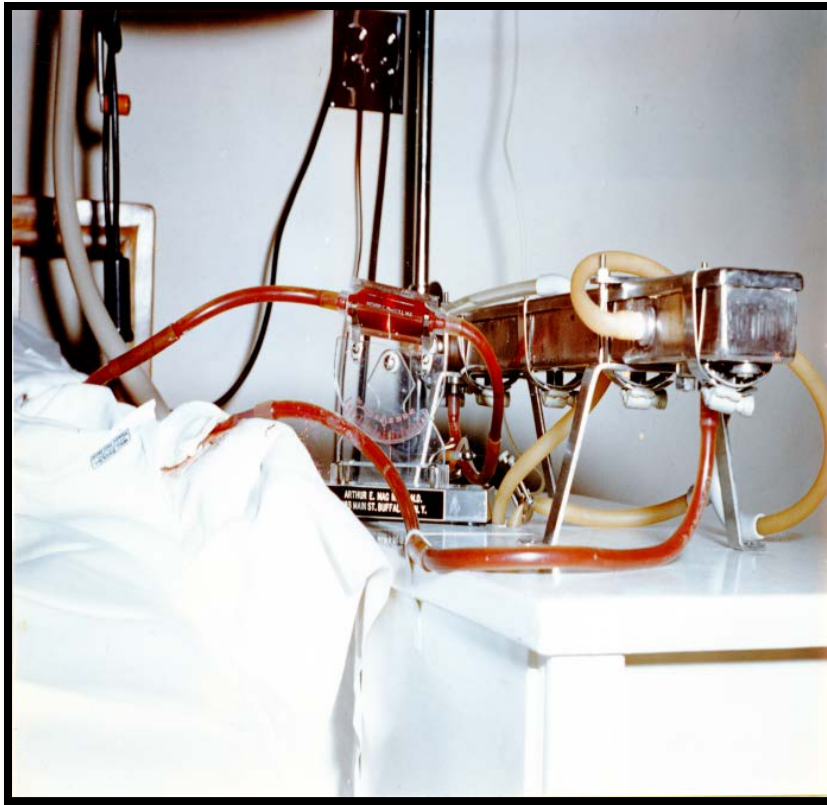
- This notebook begins in June 1953 and runs through September 1954, with notes and graphs from various trials.



3. "U.S. Army I" (152 pp.)

- This notebook contains work records of a military-type dialyzer beginning July 30, 1953. Notes, drawings, graphs, and reports relate to research and development of the machine for the period ending December 29, 1954. The notebook also includes photographs of the dialyzer and an exhibit on the application of a blood dialyzer. Additional restricted material includes clinical photographs and clinical data on the application of the blood dialyzer in human subjects.

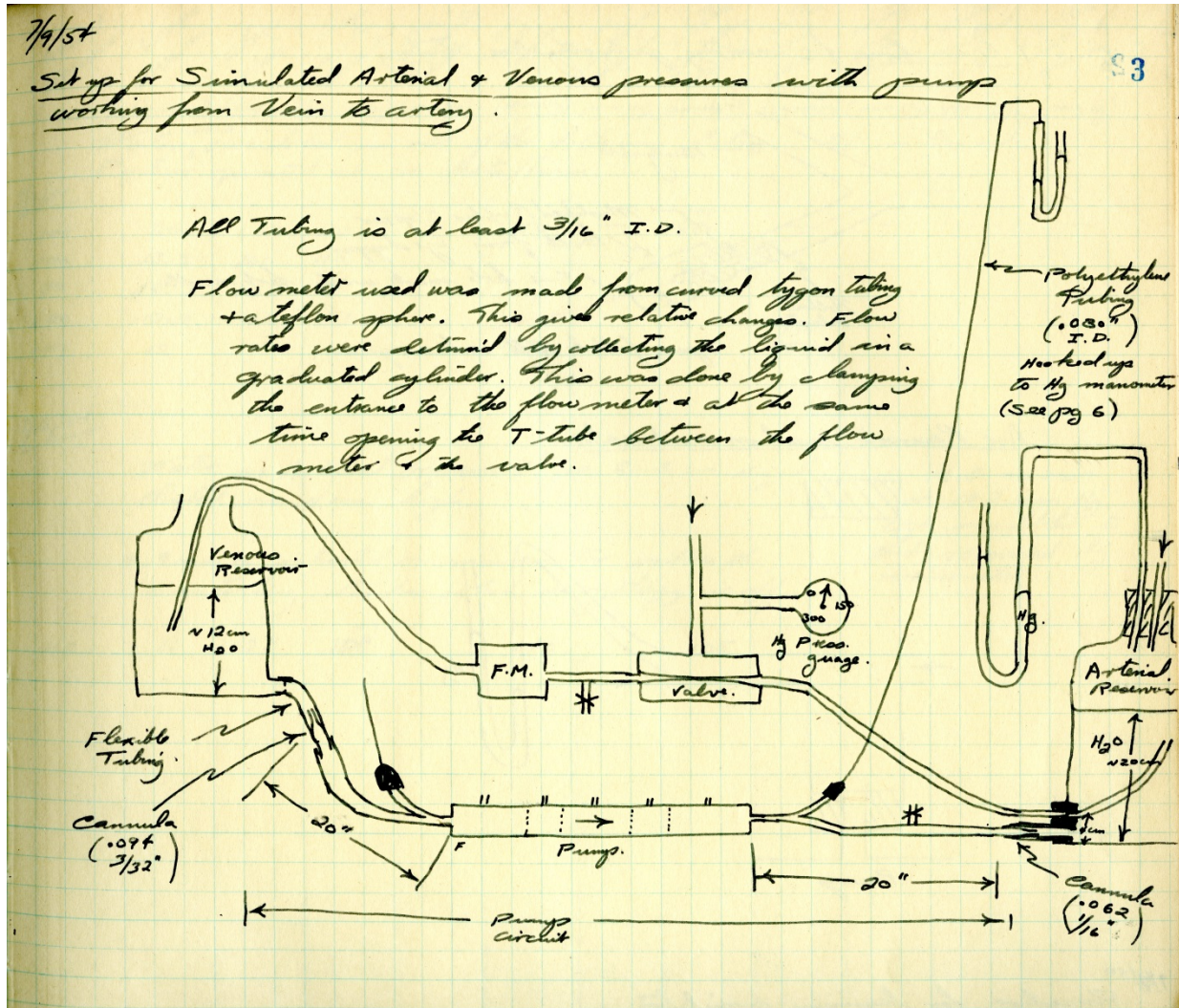






4. Blood Pump Studies

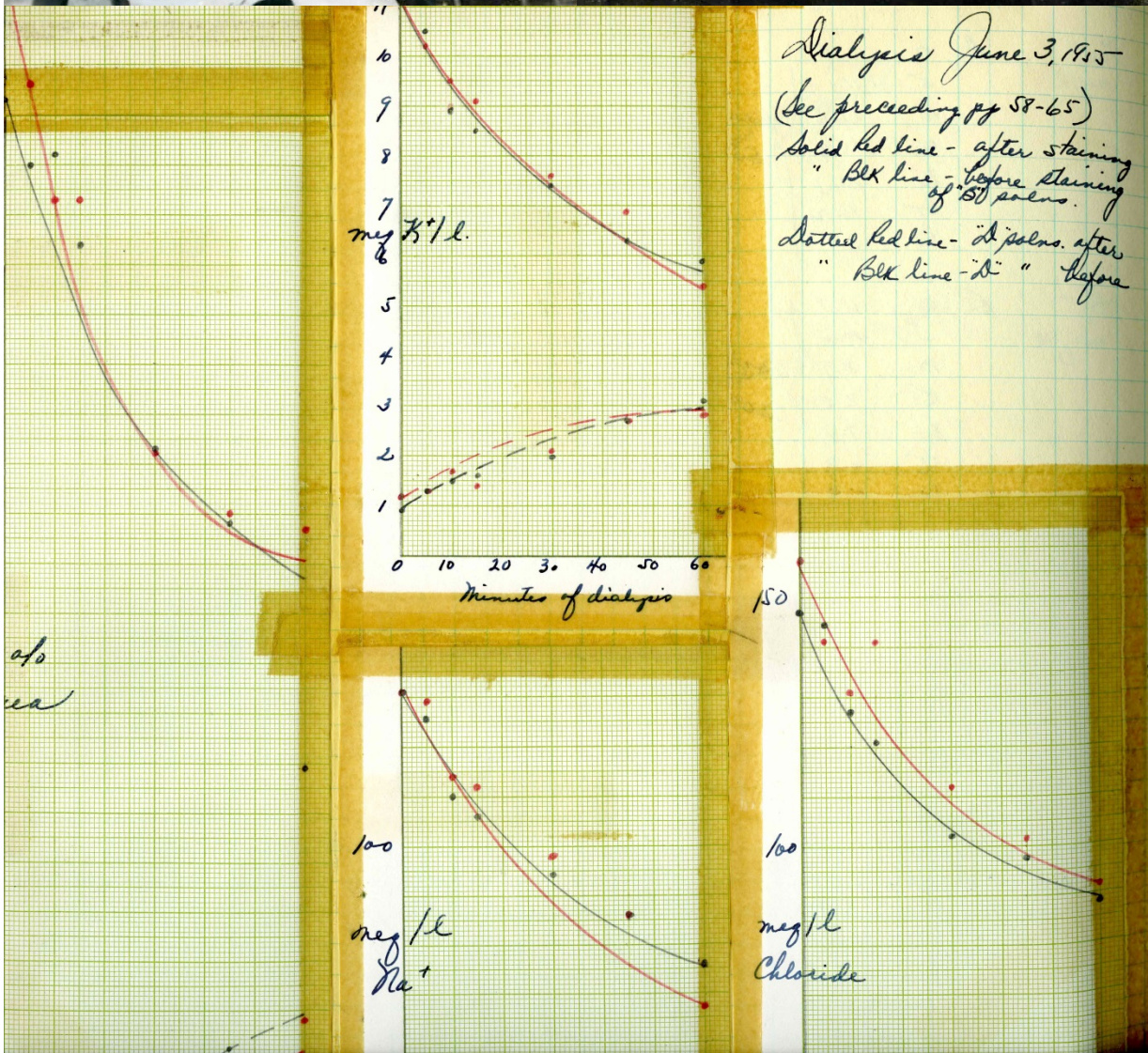
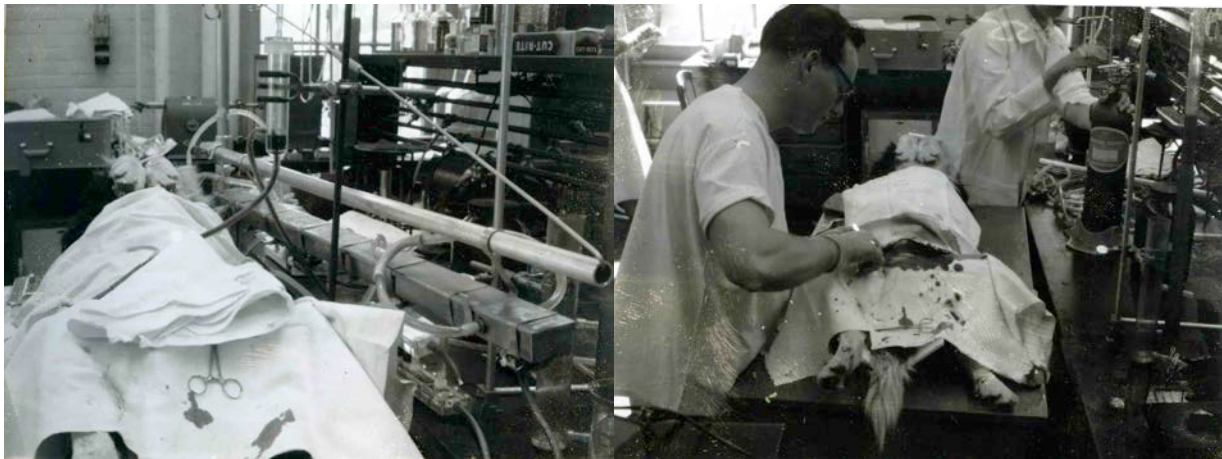
- Notes and trials from July 1954 to January 1955, including lists of equipment used for animal blood pump experiments.



Box 021: Research Notebooks [3 of 3]

1. "U.S. Army II" (107 pp.)

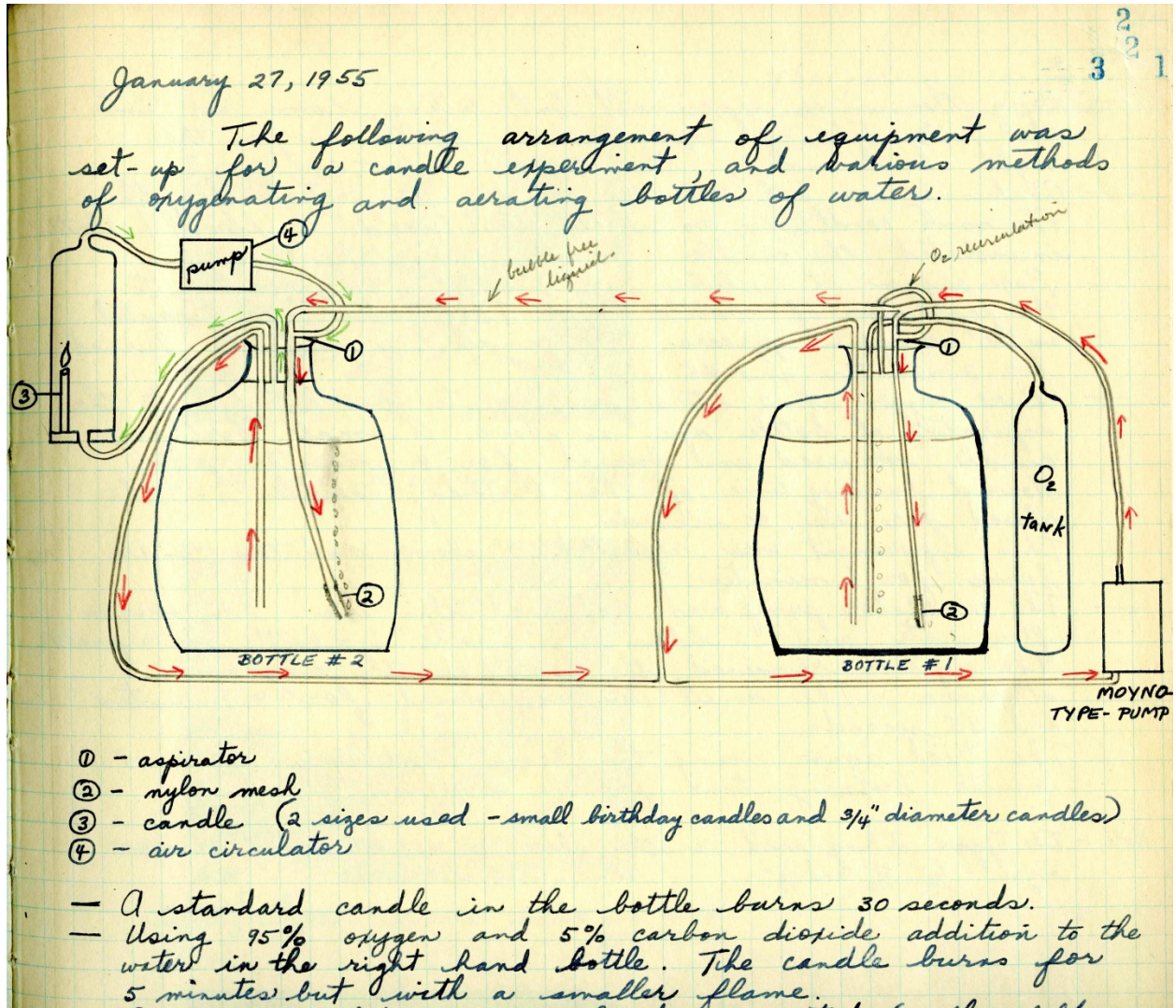
- This notebook contains work records of a military-type dialyzer beginning January 1, 1955. Notes, drawings, graphs, and reports relate to research and development of the machine for the period ending December 31, 1955. The notebook also includes a large number of restricted clinical photographs and clinical data (including diagnostic information, case histories, pathological reports, protocols, and checklists) related to the application of the blood dialyzer in human subjects.





2. Pediatric Blood Pump and Other Tests (34 pp.)

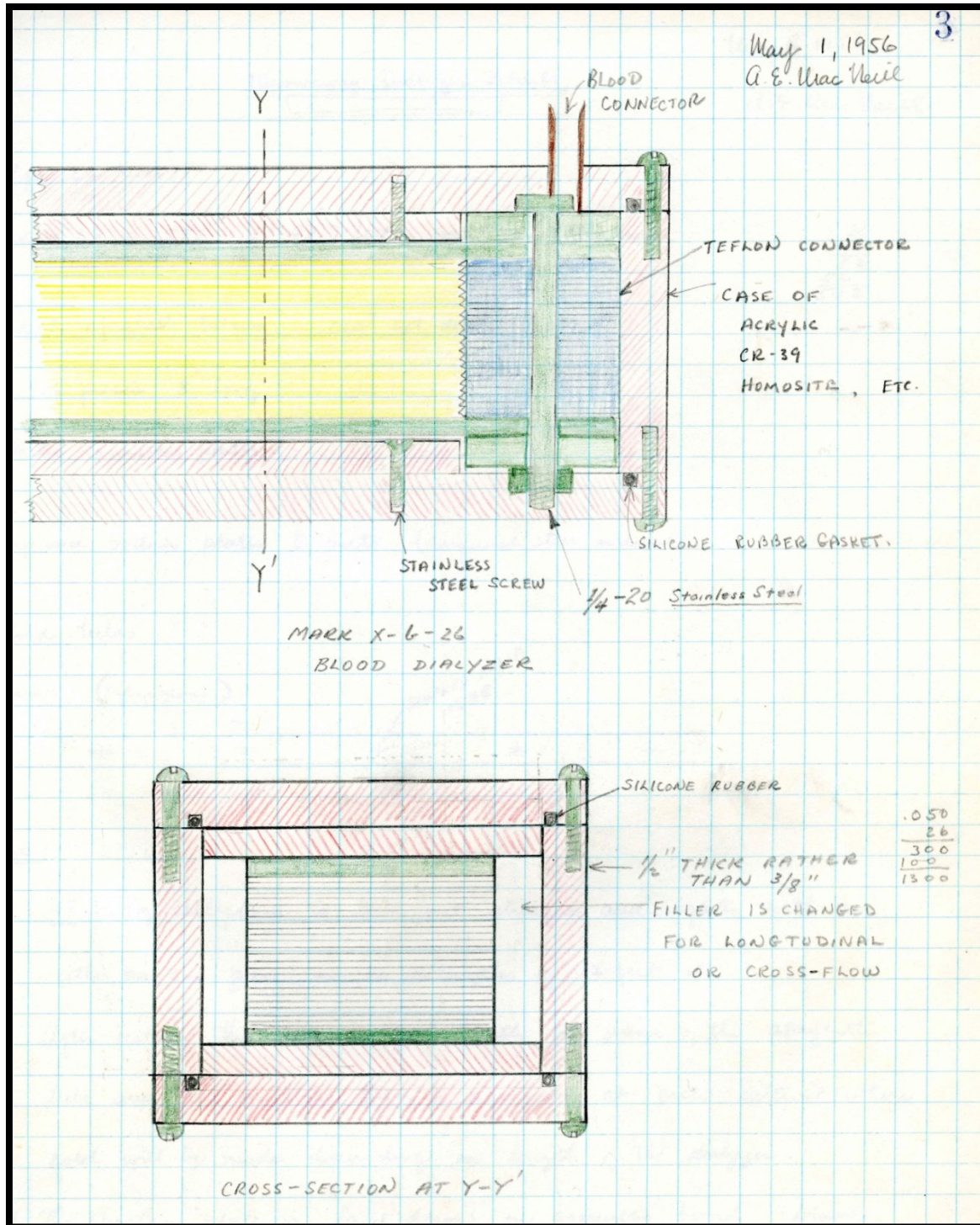
- January and February 1955, notes and diagrams related to pediatric dialyzer and oxygenation experiments; December 1957, notes on disassembled Mark IX Dialyzer; January-March 1958, evaporation studies, dialyzer testing, ; May 1958 tests of pediatric pump at children's hospital





3. Mark X Dialyzer (43 pp.)

- Drawings of flow meter, pump, and throwaway dialyzer, May 1956-December 1956; 2 pages of notes from book with label, "Dialyzer Book II, August 17-Sept 2, 1953"; six pages from journal titled "Miscellaneous"; "Gold Fish Project"; "Blood Oxygenation Data"
-



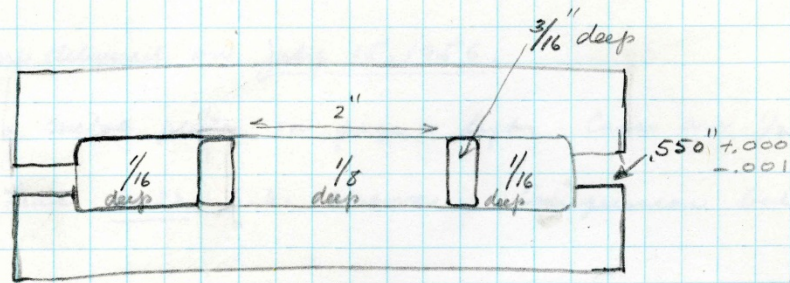


July 15, 1956

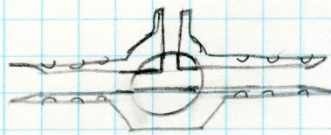
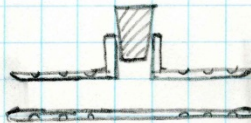
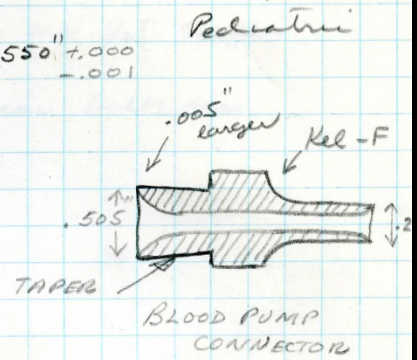
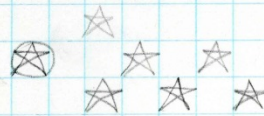
21

A. Z. MacNeill

Pediatric Blood pump dimension (FOR METCOFF)



not to scale





Oversize Materials (C22-7-B-6):

00001: "A New and Simplified Blood Dialyzer System," Arthur E. MacNeill (title board)

00002: "Blood Dialyzers, Blood Oxygenators, and Blood Pumps," Arthur J. MacNeill and John E. Doyle (Title Board and 5 additional Boards)

00003: 3 Boards from Dialyzer Exhibits

SERIES 007: GLASS SLIDES

Two boxes of glass slides show a variety of equipment as well as some text material related to blood pump and dialyzer development.